

NCR-170

Research Advances in Agricultural Statistics

Annual meeting held July 11-12, 2004 at University of Florida

Official Members Present: J. Aleong (VT), T. Bailey (IA), B. Bishop (OH), G. Bollero (IL), D. Bullock (IL), M. Christman (MD), P. Cornelius (KY), B. Craig (IN), L. Douglass (MD), S. Durham (UT), G. Fernandez (NV), E. Gbur (AR), M. Hinds (Pioneer), D. Meek (USDA-ARS-MWA), B. Momen (MD), D. Nettleton (IA), C. Ren (SD), W. Stroup (NE), R. Tempelman (MI), M. West (USDA-ARS-NPA),

Official Members Absent: L. Miller (USDA-CSREES, Admin.), E. Russek-Cohen (MD), D. Whittaker (IN, Admin.), T. Park (GA), B. Shafii (ID), J. Zhu (WI)

Guests/Participants: M. Kramer (USDA-ARS-BA), G. Milliken (KS), B. Vinyard (USDA-ARS), H. Zhang (WA), and 21 members of USSES and the University of Florida

2004 Officers: Ed Gbur, Chair; Bruce Craig, Program Chair; Mark West, Secretary

NCR-170 web site: www.uark.edu/misc/ncr170

Minutes:

Technical program: The meeting began at 8:45 am on Monday, July 11 with opening remarks by Ramon Littell. The theme of the morning session was the statistical aspects of microarray experiments. Technical presentations were given by Bruce Craig (“Statistical issues”), Rob Templeman (“Design issues”), and Dan Nettleton (“Examples of data analysis”). The afternoon session was devoted to a dry run of the spatial data workshop which is being developed by NCR-170. Presentations were given by Ed Gbur (“Basics of spatial data”), Bruce Craig (“Analysis of lattice data” and “Design in spatial experiments,” the latter with Jun Zhu), and Mark West (“Combining multi-scale spatial data”). The afternoon session ended at 5:15 pm.

Tuesday’s technical session began at 8:30 am with a presentation by Jamie Baldwin (“What does the Kenwood-Roger option do?”). The remainder of the session consisted of spatial workshop presentations by David Meek (Screening procedures for databases”) and John Aleong (“Quality control methods for spatial data”).

Business meeting: The business meeting began at 10:00 am with Ed Gbur presiding. Ramon Littell was thanked for providing an enjoyable meeting. The following items were discussed.

- (1) Suggestions for a new administrative advisor were requested.
- (2) Participants who wish to become official members were reminded that they need to file the necessary paperwork.
- (3) The midterm report has been replaced by required annual reports which must follow a prescribed format, including a list of project activities, outputs, accomplishments and

impacts. Ed requested all participants forward information to him regarding their recent activities.

- (4) The 2005 meeting will be held in Fort Collins on July 14 and 15 with Mark West as host. George Milliken agreed to serve as program chair. One objective of next year's program will be to introduce potential new topics for the project. Suggested topics of interest to members were given to George. The 2006 meeting will be hosted by Jun Zhu at the University of Wisconsin.
- (5) George Fernandez suggested that a news-group/discussion board type web site be established for NCR-170 members to interact during the year. Mark Hinds agreed to set up and maintain such a site.

The discussion then turned to the spatial workshop. Members provided feedback to the speakers and suggestions on how they might modify their presentations to match audience background. It was agreed that the workshop would be developed as a series of modules to allow it to be tailored to the needs of various subject matter audiences. The possibility of creating a CD containing a set of worked out spatial data analyses to be used in conjunction with the workshop was discussed. We probably could not sell such a CD separately because of copyright issues but it might be possible to give it to workshop attendees with production costs included as part of the workshop fee. George Milliken suggested that the workshop might be given to a subject matter audience in conjunction with next year's Kansas State Conference on Applied Statistics in Agriculture. George would need a commitment by January at the latest. It was decided to set up an ftp site where draft versions of the modules would be available for feedback directly to the authors from project members during the year. Ed Gbur agreed to set up such a site. Finally, it was decided that the workshop would not be presented as part of next year's technical program.

The meeting adjourned at approximately 11:30 am.

Accomplishments and impacts: Statisticians who consult and do research in an Agricultural Experiment Station environment enable land grant institutions to perform their agricultural research missions more effectively and efficiently than would otherwise be possible. However, most stations have at most one or two professional statisticians who are not, and can not be expected to be, experts in every area of statistics. This multi-state committee brings together statisticians to work cooperatively to determine the best current approaches to common statistical problems and to help guide future directions of sound statistical practice. In addition to group outputs such as workshops, it serves as a resource for its members and a sounding board for new ideas in their applied statistical research. As a result, all members are able to provide more effective assistance to agricultural researchers addressing national research priorities than they would without NCR-170.

The highly successful mixed model workshop developed by project members continues to be offered at regional and national subject matter meetings.

Outputs: The self-education phase in spatial statistics has essentially ended with the dry run of the workshop at the project's annual meeting. The workshop will be offered to subject matter audiences within the next year.

In addition, committee members have reported the following project related activities.

Mixed model workshop presented at:

2004 Federation of Animal Science Societies annual meeting in St. Louis by Rob Tempelman, Larry Douglass and Bruce Craig.

Department of Plants, Soils and Biometeorology at Utah State in December 2003 by Susan Durham.

USDA-ARS researchers in Logan, Utah in February 2004 by Mark West and Susan Durham. Logistic regression was also included in the workshop.

USDA-ARS researchers and Utah State faculty in April 2004 by Susan Durham with emphasis on repeated measures.

Workshop entitled “Linear and nonlinear models for correlated data” presented at the 2004 Wildlife Society annual meeting in Calgary. Instructors were Mary Christman and Larry Douglass. 60 attendees.

Invited session at the Eastern North American Region of the International Biometric Society meeting in March 2004 entitled “Statistical models for complex data in agricultural and environmental studies.” Organizers were Estelle Russek-Cohen and Jun Zhu; chair was Mary Christman. Jun Zhu presented a paper entitled “A spatial-temporal auto-logistic regression model for the analysis of Southern Pine Beetle outbreaks.”

Selected presentations at the 2004 Kansas State University Conference on Applied Statistics in Agriculture by:
Christman, M.C. and I. Estevez. Methods for the analysis of movement and use of space of animals in confinement.
O’Hara, C.G., J.L. Willers and G.A. Milliken. Spatial measurement parameters for characterizing precision agriculture.
Tian, F., B. Shafii, C.J. Williams, T.S. Prather, W.J. Price and L.W. Lass. Prediction of yellow star thistle survival and movement over time and space.
Meek, D. Covariates for problems in precision agriculture.

Presentation by R.J. Tempelman entitled “Experimental design for gene expression microarrays” at the Long Oligonucleotide Microarray Workshop at the University of Arizona in May 2004.

Several project members have become involved with the USDA-ARS Precision Agriculture group.

Specific goals for the next three years: (1) Complete the development of spatial workshops and begin to offer them to subject matter audiences. (2) Develop methodology to address both

spatial and general statistical problems in the area of precision agriculture. (3) Continue to offer the mixed model workshop upon request from subject matter groups. (4) Explore possible future directions for the project.

Publications:

Gbur, E.E., B.A. Craig and H. Zhang (2004). A simulation study of exponential semivariogram estimation. *In Proceedings of the 2003 Kansas State University Conference on Applied Statistics in Agriculture*. G.A. Milliken (ed). Manhattan, KS: Kansas State University. 121-136.

Kaspar, T., D. Pulido, T. Fenton, T. Colvin, D. Karlen, D. Jaynes, and D. Meek (2004). Relationship of corn and soybean yield to soil and terrain properties. *Agronomy Journal*, 96, 700-709.

Kaspar, T.C., T.S. Colvin, D.B. Jaynes, D.L. Karlen, D.E. James, D.W. Meek, D. Pulido, and H. Butler (2003). Estimating corn yield using six years of yield data and terrain attributes. *Journal of Precision Agriculture*, 4, 87-101.

Meek, D.W. and T.J. Sauer (2004). Suggestions for presenting kriging data. *In Proceedings of the 2003 Kansas State University Conference on Applied Statistics in Agriculture*. G.A. Milliken (ed). Manhattan, KS: Kansas State University. 258-276.

Tempelman, R.J. (2004). Experimental design and statistical methods for classical and bioequivalence hypothesis testing with an application to dairy nutrition studies. *Journal of Animal Science*, 83 (E suppl.), E162-E172.

Russek-Cohen, E. and M. Christman (2004). Statistical methods in environmental monitoring and assessment. *In Environmental Monitoring*. G.B. Wiersma (ed). CRC Press: Boca Raton, FL.

Zhang, H. (2004). Inconsistent estimation and asymptotically equal interpolations in model-based geostatistics. *Journal of the American Statistical Association*, 99, 250-261.

Zhu, J., C.L.S. Morgan, J.M. Norman, W. Yue and B. Lowery (2004). Combined mapping of soil properties using a multi-scale tree-structured spatial model. *Geoderma*, 118, 321-334.